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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/825,111	04/16/2004	Mehdi K. Khandani	MR2833-42	7710

4586 7590 08/06/2007
ROSENBERG, KLEIN & LEE
3458 ELLICOTT CENTER DRIVE-SUITE 101
ELLICOTT CITY, MD 21043

EXAMINER

SEFCHECK, GREGORY B

ART UNIT	PAPER NUMBER
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2616

MAIL DATE	DELIVERY MODE
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08/06/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

58

Office Action Summary	Application No. 10/825,111	Applicant(s) KHANDANI ET AL.	
	Examiner Gregory B. Sefcheck	Art Unit 2616	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 April 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,9-12,20 and 21 is/are rejected.
- 7) ☒ Claim(s) 2-8 and 13-19 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

- Priority to provisional application 60/463,594 filed 4/17/2003 is acknowledged.
- Claims 1-21 are pending.

Specification

1. The disclosure is objected to because of the following informalities:

On Pg. 15, line 11: "widow" should be changed to - - window - -

Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 9-12, 20, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jacobson et al. (US006934256B1), hereafter Jacobson, in view of Cheriton (US007027393B1).

- Regarding Claims 1, 9-12, 20, and 21,

Jacobson discloses a method of identifying non-adaptive flows of a plurality of flows in a TCP network, where non-adaptive flows are disclosed as flows which do not respond/conform to congestive flow control through packet dropping (Title; Abstract;

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Col. 1-2, lines 33-15; meets claim 1 - method for determining the responsiveness of a data transmission rate of data packets to packet drops in a communication network; claim 12 – method for determining amount of non-conforming to a predetermined transmission control protocol).

Jacobson discloses that a flow of data packets is identified by the contents of fields in the packet, such as source address, destination address, protocol type, etc. (Col. 1, lines 11-16; meets claim 1,12 – data packets having appended to data thereof a packet designator including an address of a source node and an address of a destination node).

Jacobson discloses an example of assigning flows to data packets having headers indicating transmission from a particular source address to a particular destination address (Col. 8, lines 36-42; meets claim 1,12 – each data packets being assigned to a corresponding one of a plurality of flows such that the packet designators of the data packets in each of the plurality of flows have equivalent corresponding source node addresses and equivalent corresponding destination node addresses).

Jacobson discloses that flows can also be identified by internal parameters of a router/switch, such as the input and output port (corresponding to source and destination), while different types of flows can be realized by choosing (selecting) different combinations of header fields to identify the flow (Col. 1, lines 16-20; meets claim 1,12 - selecting at each of the plurality of switching nodes at least one aggregating property; claim 10,20 – providing the packet designator with a source port number and destination port number; claim 11,21 – aggregating property is selected from the group

consisting of source port number, destination port number, and network application as determined from source and destination port number).

Referring to Fig. 1, Jacobson discloses network 100 connecting data transmissions between end-station 102 and 104, where network 100 represents a general computer network from a small LAN to the entire Internet, having a plurality of switches (Col. 4, lines 9-15; meets claim 1,12 – traversing network including plurality of switching nodes having a set of the plurality of flows).

Jacobson discloses utilizing a random early detection algorithm and sliding window technique in TCP protocol to determine a drop rate and calculate a drop interval for a selected flow (Col. 2, lines 20-46; Col. 6-8, lines 28-22; meets claim 1,12 - setting a packet drop rate for each of said respective aggregates).

Jacobson illustrates how a drop interval is then calculated based on the periodicity and distribution of packet drops over time (Fig. 8; Col. 8-10, lines 24-30; meets claim 1,12 - dropping from each of said respective aggregates a number of packets according to said packet drop rate; claim 1,12 - measuring a perturbed packet transmission rate for each of said respective aggregates subsequent to said packet dropping step).

Jacobson further discloses applying a statistical test on the drop interval, calculated by subtracting a packet drop time (perturbed rate) from a first measured time (nominal rate), in order to identify non-adaptive (non-responsive) flows (Col. 2, lines 35-50; meets claim 1 - estimating the responsiveness to packet drops of each of said

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respective aggregates from said perturbed packet transmission rate; claim 9 - subtracting said nominal packet transmission rate from said corresponding perturbed packet transmission rate).

More specifically, Jacobson maintains average drop interval data as a function of the transmission rate over time (Fig. 8) to determine a Departure from Exponential Median (DEM; coefficient) of the computed drop intervals for a particular flow. Jacobson discloses the DEM as a measure of conformance to adaptive congestion control, as compared to the known (nominal) DEM of 0.5 for adaptive flows (Fig. 9, 10; Col. 2-3, lines 62-23; Col. 11-12, lines 8-42; meets claim 12 - estimating the responsiveness coefficient of each of said respective aggregates from said perturbed packet transmission rate; claim 12 - maintaining an average of said responsiveness coefficient for each of said respective aggregates as a nominal responsiveness coefficient; claim 12 - calculating the amount of non-conforming traffic as a ratio of said responsiveness coefficient to said nominal responsiveness coefficient; claim 9 - maintaining a running time average of a total packet transmission rate corresponding to each said respective aggregates as a corresponding nominal packet transmission rate).

Though Jacobson discloses that different combinations of header fields can be chosen for identifying a flow to be processed at switches of the network (Fig. 1; Col. 1, lines 15-20), Jacobson does not explicitly disclose forming an aggregate from the flows according to an aggregating property at each switch of the network.

Cheriton discloses a TCP rate policer that controls the rate of TCP flows over multiple network switches/routers, utilizing packet dropping in performing the rate control (Title; Abstract; Col. 1, lines 50-53). Cheriton discloses implementation on individual TCP flows as well as across multiple individual flows at the aggregate flow level, representing all TCP flows from a single source (Col. 9, lines 1-10; meets claim 1,12 – forming a respective aggregate from the set of flows at each of the plurality of switching nodes in accordance with a corresponding one of said at least one aggregating property

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Jacobson by processing an aggregate of flows having at least one common property, as shown by Cheriton. This enables a larger range of flow granularity for managing the network, thereby providing a wider variety of options to customers for quality of service and price (Cheriton; Col. 9, lines 5-10).

Allowable Subject Matter

4. Claims 2-8 and 13-19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

- Regarding Claims 2 and 13,

The prior art of record does not teach or fairly suggest a method of determining the responsiveness to packet drops or conformity to a predetermined transmission control protocol in which a drop rate signature is assigned to each of a plurality of corresponding switching nodes for specifying an instantaneous drop rate, in which the assigned drop signature is orthogonal to the drop signature of all other ones of the switching nodes when each drop rate signature is compensated for a DC offset.

The closest prior art to Jacobsen discloses a method similar to the present application, as shown above, in which non-adaptive flows are identified based upon statistical testing of drop intervals for different flows. Jacobsen discloses applying the method "at any suitable time interval in order to avoid interfering with the packet forwarding and other work of the network device" (Col. 2, lines 37-40), but does not teach or fairly suggest the specific limitations for choosing this applicable time interval as defined by claims 2 and 13.

- Claims 3-8 and 14-19 would be allowable based upon their dependence from claims 2 and 13, respectively.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Khandani et al. (US 20070064610A1)
- Balakrishnan et al. (US 20040196790A1)
- Rhee (US 20020181494A1)
- Okholm et al. (US007203169B1)
- Wang et al. (US006985442B1)

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregory B. Sefcheck whose telephone number is 571-272-3098. The examiner can normally be reached on Monday-Friday, 8:00am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wing Chan can be reached on 571-272-7493. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Gregory Seifcheck
Patent Examiner
8-2-2007